

(12) PATENT ABRIDGMENT (11) Document No. AU-B-53892/90  
(19) AUSTRALIAN PATENT OFFICE (10) Acceptance No. 631866

(54) Title  
**LOUDSPEAKER**

International Patent Classification(s)  
(51)<sup>5</sup> H04R 007/18 H04R 007/14 H04R 007/20

(21) Application No. : 53892/90 (22) Application Date : 26.04.90

(30) Priority Data

(31) Number (32) Date (33) Country  
PJ4540 01.06.89 AU AUSTRALIA

(43) Publication Date : 06.12.90

(44) Publication Date of Accepted Application : 10.12.92

(71) Applicant(s)  
**ODYL GROUP LIMITED**

(72) Inventor(s)  
**DOUGLAS JOHN MATHEW HARLE**

(74) Attorney or Agent  
**GRIFFITH HACK & CO , GPO Box 1285K, MELBOURNE VIC 3001**

(56) Prior Art Documents  
AU 486552 70575/74 H04R 7/20  
AU 160437 8109/52 H04R 7/14  
AU 123622 18356/44 H04R 7/14

(57) Claim

1. A loudspeaker, said loudspeaker comprising a frame, a flat diaphragm having a front side and a rear side, the diaphragm being suspended from said frame by suspension means, and means for driving said diaphragm, said suspension means being connected between an outer peripheral portion of the rear side of said diaphragm and said frame.

631866

AUSTRALIA

PATENTS ACT 1952

Form 10

COMPLETE SPECIFICATION

(ORIGINAL)

FOR OFFICE USE

Short Title:

Int. Cl:

Application Number:  
Lodged:

Complete Specification-Lodged:  
Accepted:  
Lapsed:  
Published:

Priority:

Related Art:

---

TO BE COMPLETED BY APPLICANT

Name of Applicant: ODYL GROUP LIMITED

Address of Applicant: Unit 4  
11 Molan Street  
Ringwood, Victoria 3134  
AUSTRALIA

Actual Inventor: Douglas John Mathew HARLE

Address for Service: GRIFFITH HACK & CO.,  
601 St. Kilda Road,  
Melbourne, Victoria 3004,  
Australia.

Complete Specification for the invention entitled:  
LOUDSPEAKER

The following statement is a full description of this invention  
including the best method of performing it known to me:-

LOUDSPEAKER

This invention relates to a loudspeaker.

The invention may be said to reside in a loudspeaker,  
5 said loudspeaker comprising a frame, a flat diaphragm  
having a front side and a rear side, the diaphragm being  
suspended from said frame by suspension means, and means  
for driving said diaphragm, said suspension means being  
connected between an outer peripheral portion of the rear  
10 side of said diaphragm and said frame.

Preferably the suspension means comprises an annular  
member having a wave configuration in radial cross-section,  
said wave configuration comprising two peaks and two  
15 troughs, said membrane being approximately 20 mm in length  
between connection points on said



diaphragm and said frame and said peaks and troughs having an amplitude of approximately 1.25 mm and a distance between peaks of approximately 5 mm.

Preferably said diaphragm comprises a flat  
5 diaphragm formed from a dense polystyrene material.

Preferably said driving means comprises a magnet and voice coil arrangement mounted on said frame and coupled to said diaphragm.

A preferred embodiment of the invention will be  
10 described in detail, by way of example, with reference to the accompanying drawings in which:

Figure 1 is a rear view of a loudspeaker embodying the invention;

Figure 2 is a front view of a loudspeaker  
15 embodying the invention;

Figure 3 is a cross-sectional view of a first embodiment of the invention;

Figure 4 is a cross-sectional view of a second embodiment of the invention;

20 Figure 5 is a detailed view of the suspension means using the preferred embodiments of the invention; and

Figures 6 and 7 are views of a further embodiment of the invention.

25 With reference to the drawings the loudspeaker comprises a frame 10 which may be stamped or pressed from a suitable material. The frame 10 includes a base portion 12 which is provided with cut-outs 14 and a central support section 16 for supporting a magnet 18.  
30 The magnet 18 is associated with a voice coil 20 which is coupled to a diaphragm 22. The frame 10 is provided with an annular wall portion 24 which is generally perpendicular to the base portion 12 and the wall portion 24 is provided with a flange portion 26 which extends

generally parallel to the base portion 12 for securing the loudspeaker to a support 30 by means of screws or the like 32.

The preferred embodiment of the invention is particularly adapted for mounting in a roof or a wall and the support 30 may comprise a plaster roof, plaster wall or polystyrene ceiling tiles or the like. Alternatively, the speaker could be mounted in a speaker box.

The diaphragm 22 is preferably formed from a dense polystyrene material and is planar in configuration. The diaphragm 22 is coupled to the frame by an annular suspension member 50 which is schematically shown in Figures 3 and 4 and which is shown in correct detail in Figure 5.

The embodiment shown in Figure 4 is generally the same as that shown in Figure 3 except that the Figure 4 embodiment is a smaller diameter loudspeaker.

As is best shown in Figure 5 the suspension member 50 preferably comprises a linen or cotton member treated with phenolic resin. The suspension member has a wavelike configuration and comprises two peaks and two troughs. The length L of the suspension member between the point where it is connected to the diaphragm 22 and the point where it is connected to the generally vertical wall 24 of the frame 10 is approximately 20 mm, the amplitude A of the peaks and troughs of the wavelike configuration is approximately 1.25 mm and the distance B between peaks is approximately 5 mm. As is shown in Figures 3 to 5, the wall portion 24 of the frame 10 preferably comprises a first portion 24a which is generally parallel to the diaphragm 22 and portions 24b which are generally perpendicular to the diaphragm 22. The membrane 50 is connected to portion 24a and also to the outer peripheral portion 40 of the rear face 41 of the diaphragm 22. The diaphragm 22 has a sculptured

portion 42 and a front face 44 which extends radially outwardly of the end portion 40 of the rear face 41 of the diaphragm 22.

The frame 10, as best shown in Figure 1, and 5 include mounting slots 60 for mounting equipment such as a transformer or the like and can also include rib 62 for adding strength.

With reference to Figures 6 and 7 which show a further embodiment of the invention in which the 10 diaphragm 22 is suspended in an identical way to the previously described embodiment. The only difference between the embodiments of Figures 6 and 7 and the earlier embodiments is the shape and configuration of the frame 10. In this embodiment the frame 10 has a base 15 portion 12 which has a raised inner section 12' which supports a plate 58 and a magnet 18. The base 12 has a plurality of circular openings 60 and a stepped peripheral portion 64 which leads to a generally vertical wall 66. As in the earlier embodiments the diaphragm 22 20 is suspended by suspension member 50 which is identical to that described with reference to the earlier embodiments. In this embodiment the suspension member 50 is sandwiched between the stepped portion 64 of the base 12 and the vertical wall 66 which are separate from one 25 another and are joined by rivets 68.

Since modification within the spirit and scope of the invention may readily be effected by persons skilled within the art, it is to be understood that the invention is not limited to the particular embodiment 30 described by way of example hereinabove.

## THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:

1. A loudspeaker, said loudspeaker comprising a frame, a flat diaphragm having a front side and a rear side, the diaphragm being suspended from said frame by suspension means, and means for driving said diaphragm, said suspension means being connected between an outer peripheral portion of the rear side of said diaphragm and said frame.
2. The loudspeaker of claim 1 wherein the suspension means comprises an annular member having a wave configuration in radial cross-section, said wave configuration comprising two peaks and two troughs, said membrane being approximately 20 mm in length between connection points on said diaphragm and said frame and said peaks and troughs having an amplitude of approximately 1.25 mm and a distance between peaks of approximately 5 mm.
3. The loudspeaker of claim 1 or claim 2 wherein said diaphragm is formed from a dense polystyrene material.
4. The loudspeaker of claim 1, 2 or 3 wherein said driving means comprises a magnet and voice coil arrangement mounted on said frame and coupled to said diaphragm.
5. The loudspeaker according to any one of the preceding claims wherein said frame comprises a base portion and a separate vertical wall portion, said suspension member being connected to said frame by being sandwiched between said vertical wall portion and said base portion and means for securing said vertical wall portion to said base portion.



6. The loudspeaker according to claim 5 wherein said means for securing the base portion to the vertical wall portion comprises a plurality of rivets.

7. A loudspeaker substantially as hereinbefore described with reference to any one of the embodiments described with reference to the accompanying drawings.

Dated this 27th day of July 1992

ODYL GROUP LIMITED

By Its Patent Attorneys:

GRIFFITH HACK & CO

Fellows Institute of Patent  
Attorneys of Australia.



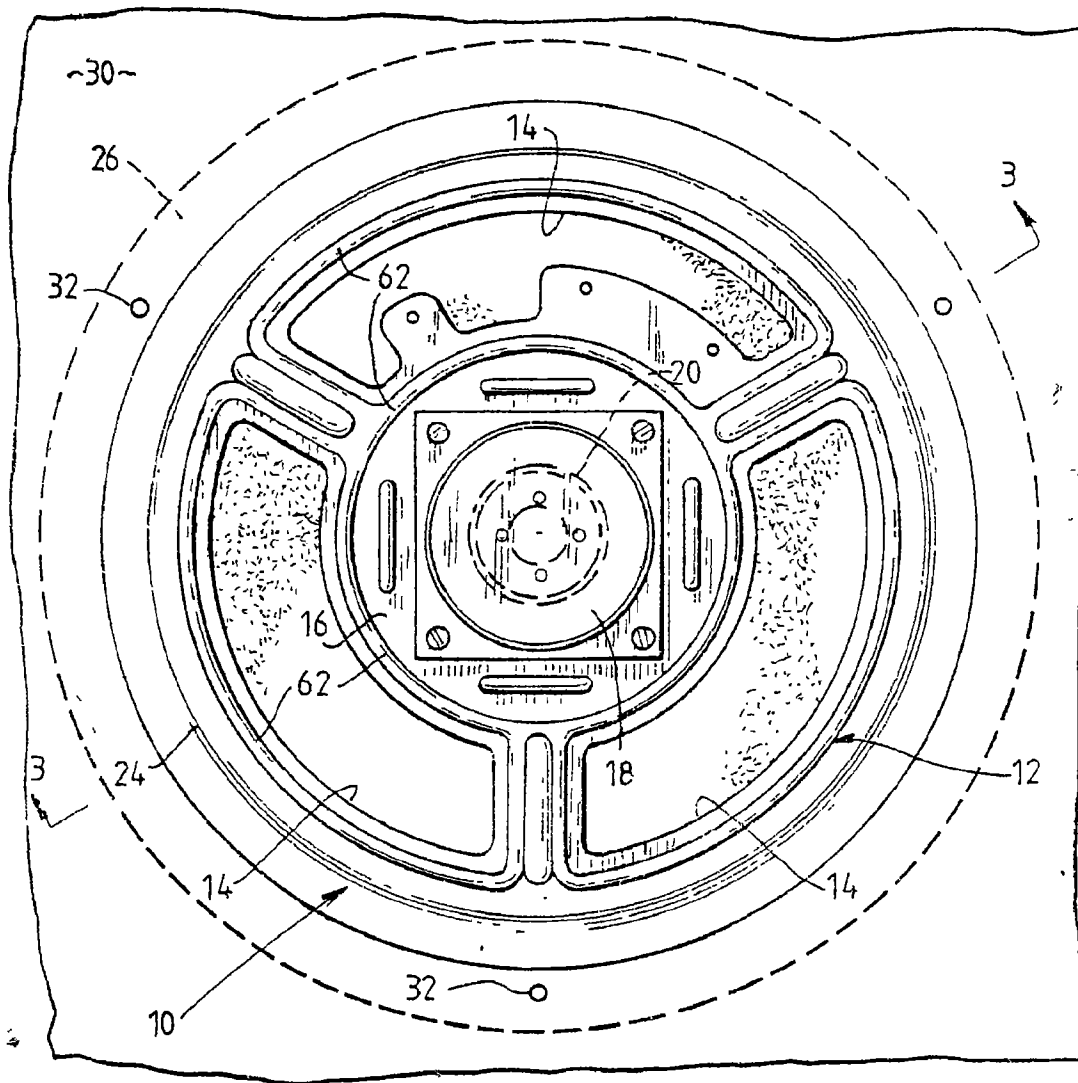


FIG. 1.

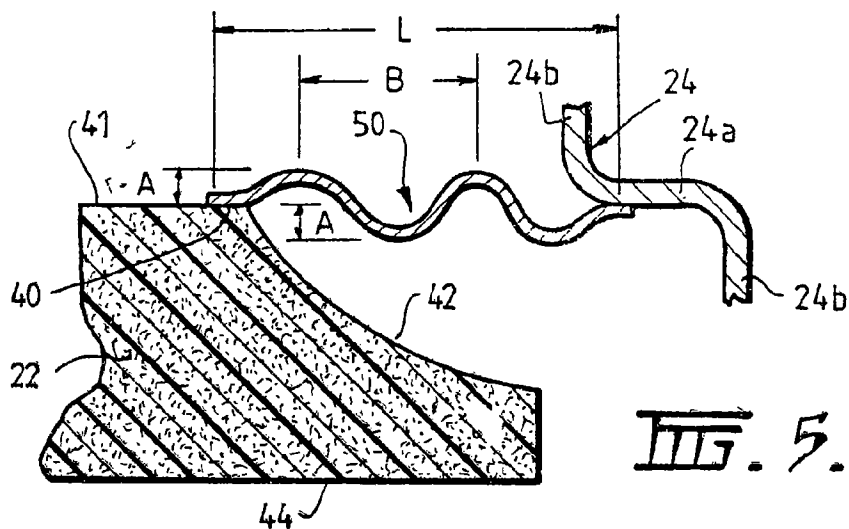


FIG. 5.

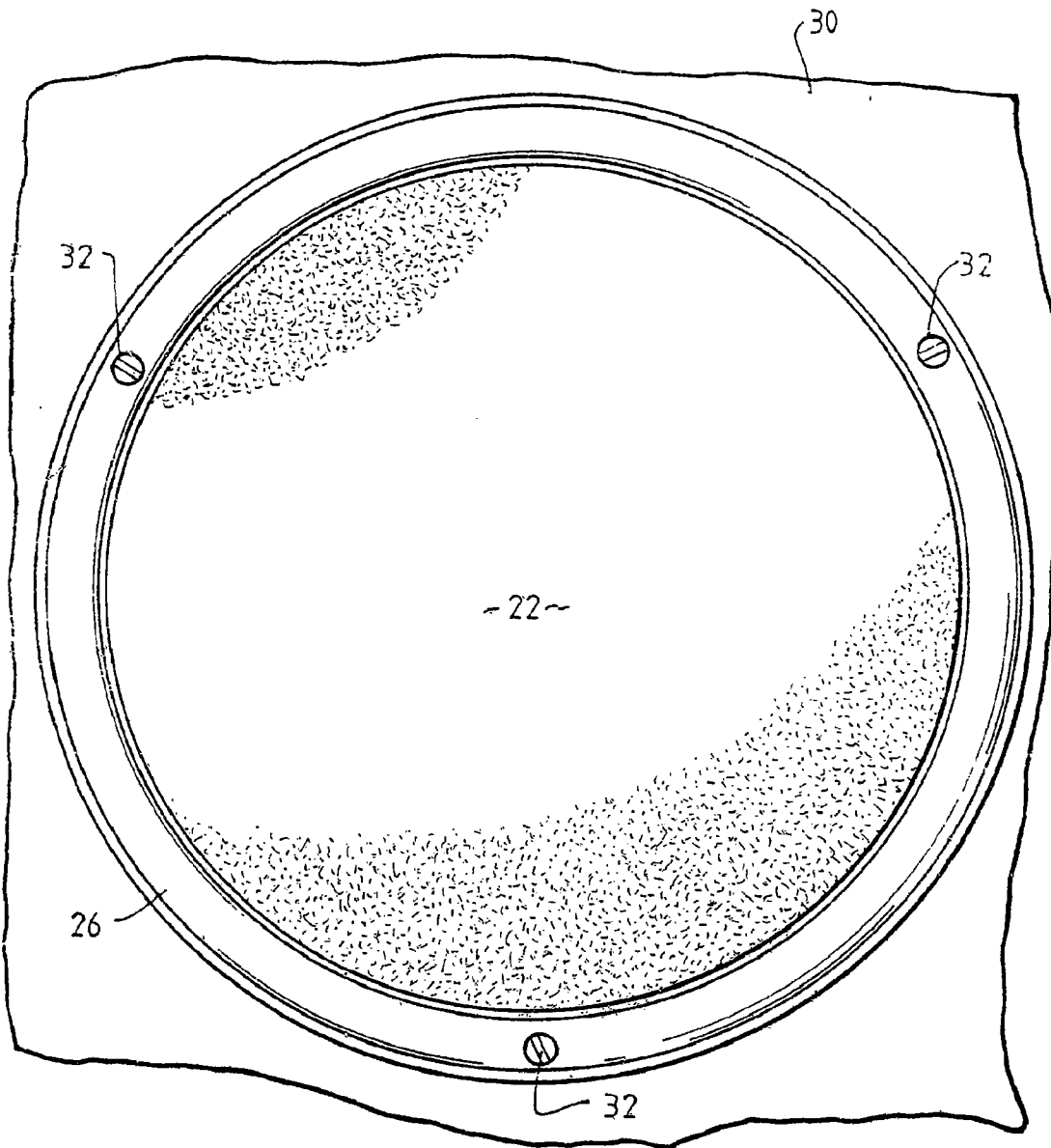


FIG. 2.

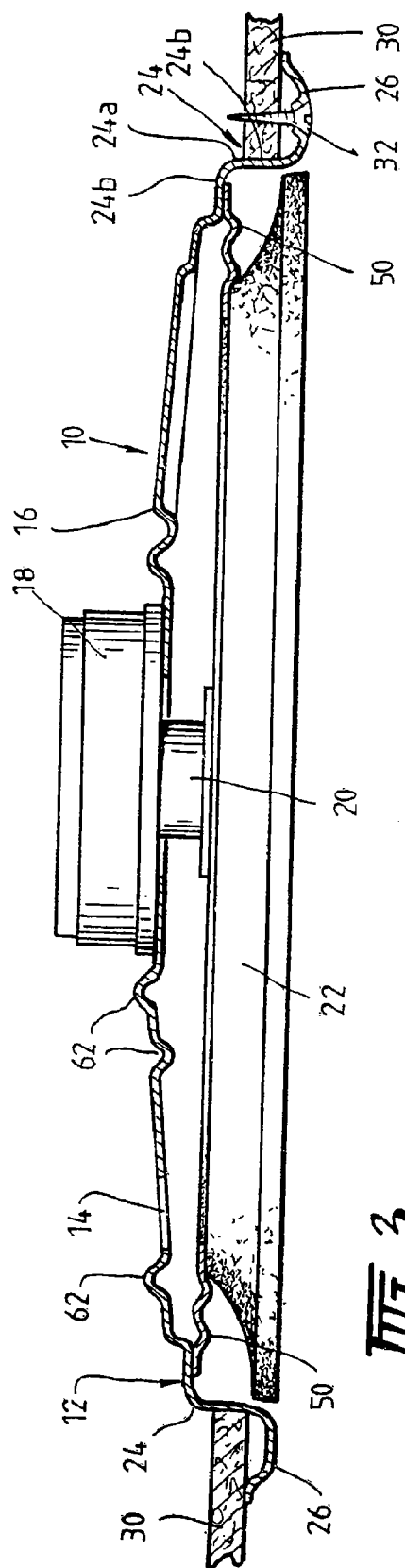


Fig. 3.

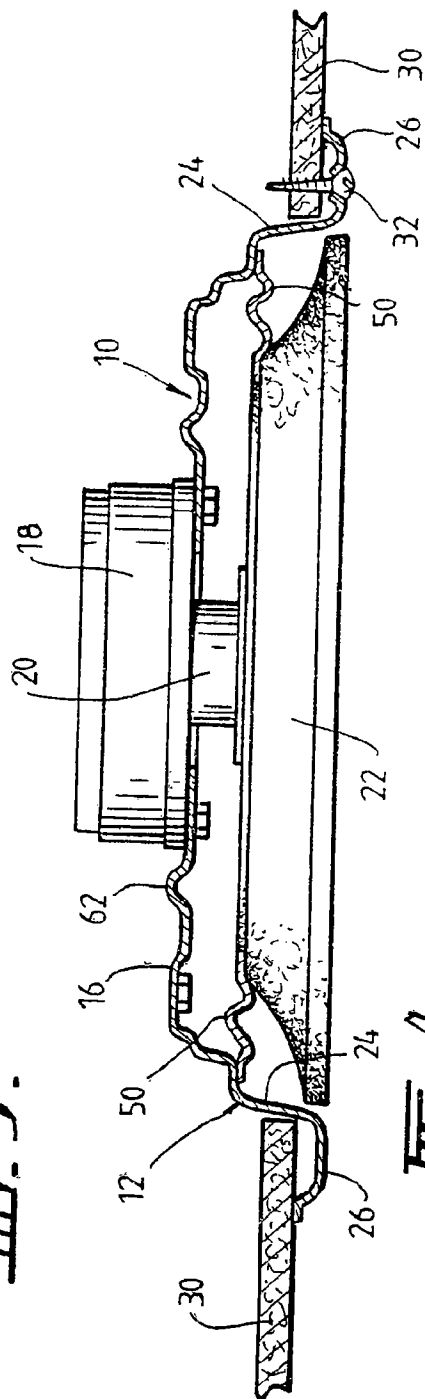


Fig. 4.

